



THE CITY OF NEW YORK  
OFFICE OF THE MAYOR  
NEW YORK, N. Y. 10007

May 2, 2016

Dino Flore, 3GPP TSG RAN Chair  
Satoshi Nagata, 3GPP TSG WG RAN1 Chair  
3GPP Mobile Competence Centre  
c/o ETSI  
650, route des Lucioles  
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France

**VIA: EMAIL**

Dear Mr. Flore and Mr. Nagata:

I write to you on behalf of the City of New York (the "City") regarding 3GPP Long Term Evolution based technologies operating in the unlicensed bands where Wi-Fi currently operates. The City benefits from and supports technological advancement. The City is also committed to ensuring digital inclusion of all our residents, no matter their zip code or income. Unfortunately, far too many of our residents lack home broadband and struggle to afford basic service. Therefore, the City has embarked on an aggressive effort to achieve universal broadband for all New Yorkers, including affordable high-speed residential service and free service in public areas. Wi-Fi is a central part of this effort and any technological interference with our ability to deliver free and affordable wireless access to our residents is of grave concern.

Our wireless projects are numerous and will quite literally touch millions of people when they are fully completed. We are proud that they include both nonprofit and for-profit partners, and increasing strategic coordination across City agencies. The City continues to make major investments in Wi-Fi systems. These include:

- LinkNYC, a public-private partnership to convert legacy payphones into a citywide system of at least 7500 high-speed hotspots at an estimated cost of \$200 million. Built by a consortium of companies, LinkNYC will be the largest and fastest municipal Wi-Fi network in the world, serving all of New York's 8.5 million residents and 54 million annual visitors.
- Harlem Free Wi-Fi, a neighborhood zone of ubiquitous Wi-Fi coverage that currently serves an average of 17,500 unique users per month and connected over 100,000 sessions in the most recent month. This service is available thanks to a \$5 million gift from the Fuhrman Family Foundation. The City has supported the creation of four additional wireless corridors that together connected an average of 40,000 sessions per week in 2015.
- Queensbridge Wi-Fi, which will deliver free high-speed broadband service to the 7000 residents of the Queensbridge Houses, the largest public housing development in North America. The Mayor has committed to delivering free broadband service to more than 21,000 public housing residents in total across all five boroughs.
- Red Hook Wi-Fi, a wireless network that will provide Internet service to the 6500 residents of the Red Hook Houses along with connections to community centers, public spaces and local businesses. Red

Hook was severely impacted by Superstorm Sandy and the Red Hook Wi-Fi network incorporates resilience features to keep the neighborhood connected through any future disasters. The City has made an award to build another six such resilient wireless networks to support Sandy-impacted small businesses throughout the city.

- The City's Department of Education manages over 75,000 Wi-Fi access points across 1309 buildings to serve over 1 million students every school day.
- The City's three library systems provide Wi-Fi connectivity in all of our 203 branches, supporting 260,000 sessions in a typical month. In addition, the libraries have, at present, loaned out 10,000 free mobile hotspots to patrons throughout the city.
- The City has worked with major Internet service providers to provide Wi-Fi access at 122 City parks.
- The City issued a franchise to Transit Wireless to serve Wi-Fi access points in all of the City's 279 underground subway stations.

Each of these initiatives was created to serve the public welfare through economic development, education, civic engagement and recreation. They involve unique combinations of partners, equipment vendors and circumstances. But they all have the common element of relying on Wi-Fi, which is the most available and affordable wireless broadband technology. Clearly, any threat to Wi-Fi is a threat to the very fabric of the city.

The potential for Long Term Evolution - Unlicensed technology, such as LTE-U, License Assisted Access (LAA) and eLAA (collectively "LTE-Unlicensed) to interfere with Wi-Fi is a cause for grave concern. Even a modest loss of coverage area for a Wi-Fi hotspot, when multiplied and magnified over the scale of New York City, could impact millions of users daily and decrease the value of hundreds of millions of dollars of public and private investment. Likewise, any increase in latency could undermine the utility of the City's investments for innovative voice and video applications.

LinkNYC will provide strong coverage at a minimum of 150 feet from a kiosk. The initial Links are providing coverage up to 400 feet in some cases, including down side streets, which means many more people in many more parts of the city will be able to take advantage of the system's seamless handoff capabilities. That scale of consistent and abundant connectivity has the potential to drive enormous innovation for the City. Based on initial analysis, that additional coverage is at signal strengths below -72 dBm and down to signals as low as -90 dBm. Interference from LTE-Unlicensed in that range would potentially eliminate one of the core benefits of the technology throughout much of its footprint.

For Queensbridge Wi-Fi, we face the challenge of delivering consistent connectivity throughout a large complex of 95 buildings built in the 1930s. The network has been designed based on radio frequency surveys showing the more than 3000 apartments can be served by roughly a thousand strategically-placed access points. Were LTE-Unlicensed signals to cause interference that number could need to be tripled, potentially making the project prohibitively expensive. The Queensbridge system will also support Wi-Fi calling, but if nearby LTE-Unlicensed signals resulted in increased latency, that benefit to the residents could be lost.

The City's Department of Education manages its Wi-Fi system to ensure every student in every classroom can connect to the Internet, but coverage at signal strengths well below -72 dBm can extend into auditoriums, cafeterias and other places where students congregate. LTE-Unlicensed interference at those Wi-Fi signal levels could disconnect our students at key times in the day.

As a general principle, any wireless technology deployed in a band that provides broadband access to millions must incorporate the basic protocols for fair sharing of the unlicensed bands, including listen-before-talk, exponential backoff, and sensitivity to lower level Wi-Fi signals (e.g., below -72 dBm). We are heartened that LAA, the variant of LTE-Unlicensed being standardized by 3GPP, incorporates some of the coexistence mechanisms above, but remain concerned about the lack of coexistence mechanisms for lower level Wi-Fi signals.

In addition, my office has reviewed the liaison letters sent to you by the Wi-Fi Alliance and IEEE. There are additional claims detailed in those letters that add to our concern. I encourage 3GPP to carefully consider the concerns in those letters, especially the potential impact of 3GPP standardized LTE-Unlicensed on lower level Wi-Fi signals, and ensure that the specification fully protects such signals. Such Wi-Fi signals are necessary to deliver solid broadband access to millions of the city's residents and visitors.

I understand that the Wi-Fi Alliance is developing a Coexistence Test Plan for proprietary LTE-U. I hope that such a plan will account for all of the use cases cited above. I strongly encourage that a similar test plan be created for 3GPP versions of LTE-Unlicensed to ensure coexistence with Wi-Fi prior to any widespread deployment.

Please copy me on your response to the Wi-Fi Alliance and IEEE letters, and I look forward to reviewing your analysis of coexistence of LTE-Unlicensed with Wi-Fi at lower signal levels.

The City will remain vigilant on any technological or regulatory developments that would undermine our ambitious efforts to use Wi-Fi to connect all New Yorkers to the benefits of broadband. We appreciate your consideration in this matter. If you have any questions or would like further information about the City's use of Wi-Fi, please do not hesitate to contact me.

Sincerely,



Maya Wiley  
Counsel to the Mayor

Cc: Julius Knapp, FCC Office of Engineering & Technology (OET)  
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Paul Nikolich, Chair IEEE 802 LAN/MAN Standards Committee